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It is asserted by those who have made a close study of the subject that prior to the Gulf coast storm of August 16 and 17, 1915, no cases of malaria occurred at Galveston except in persons who had acquired their infection on the mainland in Texas or other States. It was further asserted that no *Anophelinæ* were to be found upon Galveston Island, and the observations of the writer tally with that statement. It is stated by observers that immediately after the storm there was almost a total absence of mosquitoes, this condition lasting about a week or 10 days; longer, according to others. Mosquitoes in considerable number reappeared later and have since been continuously present. The great majority of these mosquitoes are *Culicinæ*, only a few *Anophelinæ* having been found, although this may be due to lack of competent observation.

The bayous of Galveston Bay and the tributary creeks have long had a bad reputation as malarial districts; the contiguous mainland has, therefore, developed many cases of that disease. As the wind during the early part of the last storm blew from northerly points of the compass toward the city, it appears probable that infected mosquitoes were blown there, some of them falling into shelters, where they remained after the wind veered and while the city was partially submerged. It has been contended that *Anophelines* could not find proper breeding places on the island, but this assertion must be regarded with some doubt for the present, as it seems unlikely that the insects blown to Galveston in August could still be the active infecting agents.

Since the date above mentioned, however, a noteworthy number of cases of severe malarial infections have been met with, which in many cases were of the pernicious type and in persons who had not been on the mainland. Malaria is not a reportable disease, and it has not been possible to secure figures giving reliable data as to the actual number of cases. One physician, however, who has an extensive private and consultation practice, informed the writer that he had seen 25 cases during October and November, 1915, and that microscopical examinations of the blood showed the presence of the estivo-autumnal parasite.

PUBLIC HEALTH ADMINISTRATION IN NORTH DAKOTA.

By CARROLL FOX, Surgeon, United States Public Health Service.

The following report gives the results of a study of public health administration and organization in North Dakota, carried on throughout a period of about seven weeks, beginning September 17, 1915.

The State of North Dakota has an area of approximately 70,195 square miles and, according to the State census of 1915, a population

of 636,741. It is essentially an agricultural State, the principal product being grain. Cattle raising, coal mining, and dairying are also engaged in. Manufacturing is of minor importance. The nature of the principal industry is instrumental in bringing into the State in the spring and fall of the year a large floating population to work on the farms.

There are six cities having a population of over 5,000—Fargo, the largest, with 20,549; Grand Forks, next in size, with 13,554; Minot, with 10,053; Bismarck, with 6,344; and Jamestown, with 5,506. The capital, Bismarck, is located on the Missouri River, in the south central part of the State, and on the Northern Pacific and Soo Railroads.

For information and assistance received in this study the writer is indebted to the secretary of the State board of health and his clerk, the local health officers, and other State and county officials.

STATE BOARD OF HEALTH.

Composition of the board.—The board of health is composed of three members, one of whom is president, one vice president, and one the "superintendent" of public health. The attorney general is ex officio president of the board. The vice president and superintendent of public health are appointed by the governor. The superintendent must be a resident of the State, a graduate of a reputable medical college, and licensed to practice medicine within the State.

Tenure of office.—The appointees of the governor hold their office for two years from the first Tuesday in April succeeding their appointment and until their successors are elected and qualified.

Meetings of the board.—The board is required to meet as often as once in every six months at such place within the State as it may select.

Duties of the officers of the board.—The president presides at the meetings of the board, and in his absence the vice president performs the same duties. The superintendent of public health keeps the proceedings of the board and performs such other duties as are required by law or prescribed by the board of health. He is required to submit biennial reports to the governor, showing the activities carried on by the board of health for the previous two years.

Compensation.—The president and vice president receive no salary, but each is allowed 5 cents for every mile traveled in the performance of his duties, and other necessary expenses. The superintendent of public health receives a salary of \$1,200 per year and the same allowances as the other members of the board. In addition to this, he is allowed \$1,100 for clerk hire, printing, traveling, and all other expenses of the board of health.

Powers and duties of the board.—The State board of health is empowered to fix the time and place of the meetings of the board; to make rules and regulations for the government of the board; to make and enforce all needful rules and regulations for the prevention and cure and to prevent the spread of any contagious, infectious, or "malarial" diseases among persons and domestic animals; to establish quarantine and isolate any person affected with contagious or infectious disease; to isolate, kill, or remove any animal affected with contagious or infectious disease; to remove or cause to be removed any dead, decaying, or putrid body or other substance that may endanger the health of persons or domestic animals; to condemn or cause to be destroyed any impure or diseased article of food that may be offered for sale; to superintend the several boards of health in cities, villages, and towns, and to make such rules and regulations as it may deem necessary to govern the preparation of dead bodies for transportation and to govern what classes of dead bodies may be transported and the manner thereof.

Secretary of the board of health.—The secretary of the board of health, who is known under the law as the "superintendent" of public health, is a part-time official, who, like the other members of the board, changes with each change of governors. The private office of the secretary is also the official office of the State health organization, and the location of the latter shifts to different parts of the State with each change of administration, depending on the locality in which the secretary happens to be engaged in the practice of medicine. It is rare to have any two members of the board in the same place at the same time except during the infrequent meetings of the board of health. The secretary is given one assistant, a clerk, who receives \$600 a year.

It is obvious that under the circumstances the health problems of the State can not be taken up seriously as far as the board of health is concerned. The lack of organization has resulted in other State bodies, working independently of each other, attempting to perform the duties of a State health department. Thus we find engaged in such work the State public health laboratory, the commissioner of food and drugs, the dairy commissioner, the hotel inspector, school boards, and the antituberculosis society. This independent work can be only superficial, and no decisive results can be expected until the various public-health functions are correlated and placed in a properly organized health department under the direction of one full-time man.

The duties of the board of health and its secretary relating to diseases among animals have been largely taken over by the live-stock sanitary board, a State organization of more recent formation.

The State superintendent of health is also ex officio secretary of the embalmers' examining board.

REGISTRATION OF BIRTHS AND DEATHS.

The registration act of the State of North Dakota was passed in 1907 and conforms very closely in its provisions to the model law for the registration of births and deaths proposed by the United States Census Bureau. For this reason it is not necessary to summarize it in this report.

The State superintendent of health is ex officio State registrar of births and deaths. The city auditors and the clerks of the various townships and villages are ex officio local registrars for their respective districts. Local registrars in unorganized territory are appointed by the State registrar. The law makes provision for the appointment of deputy registrars by the local registrars, but records in the office of the State board of health fail to show the number that have been appointed to this position.

Local registrars receive a fee of 25 cents for each correctly made out birth or death certificate and "no report" card sent to the State registrar, except where the official acting as registrar receives a fixed salary. The fees are paid annually by the counties after certification by the State registrar.

Death registration.—During the 12-month period ended June 30, 1915, there were registered with the State registrar 3,504 deaths, exclusive of stillbirths. This number of deaths in a population of 636,741 gives a death rate of 5.5 per 1,000 inhabitants for the entire State. Such a low death rate is obviously incorrect. It signifies that the death registration is far from satisfactory.

The larger cities are striving to bring their registration to a high state of efficiency. The State records show that during the year ended June 30, 1915, the city of Fargo had 306 deaths, 61 of which were recorded as in nonresidents; therefore at least 245 deaths can be credited to the city, which number in a population of 20,549 gives a death rate of 11.9 per 1,000. Grand Forks during the same period had 183 deaths, 50 of which were recorded as in nonresidents; therefore there can then be credited to the city at least 133 deaths. The population being 13,554, this gives a death rate of 9.8. It is thought that an average of the death rates in these two cities might be used as a fair indication of the rate that should obtain in the State as a whole, that is approximately 10. Therefore it may be assumed that at present only about 50 per cent of the deaths that actually occur in the State are registered.

The counties in the State having the highest death rates are Cass, with a rate of 9.7; Grand Forks, 9.8; and Burleigh, 9.7. These rates are more consistent with what actually occurs and are explained by the more efficient registration in the cities of Fargo, Grand Forks, and Bismarck, situated in these counties. If the registration in the

rural communities were as complete, the rates would no doubt increase.

Notwithstanding that the death registration is very incomplete, an analysis of the certificates submitted is of interest. Of 3,504 deaths registered, 1,967, or 56.13 per cent, were due to causes that might have been prevented. These preventable deaths can be classified as follows:

Disease.	Deaths.	Per cent of total deaths.
Typhoid fever.....	46	1.31
Measles.....	28	.80
Whooping cough.....	44	1.25
Scarlet fever.....	16	.45
Diphtheria.....	23	.66
Influenza.....	20	.57
Simple meningitis.....	40	1.14
Pulmonary tuberculosis.....	188	5.37
Other forms of tuberculosis.....	58	1.66
Pneumonia.....	300	8.56
Diarrhea and enteritis.....	152	4.34
Other pre-natal diseases.....	96	2.74
Malignant growths.....	198	5.65
Deaths due to accidents.....	227	6.48
Convulsions, congenital debility, malnutrition, accidents at birth, premature birth, and other causes peculiar to early infancy.....	531	15.15
Total.....	1,967	56.13

The records show but six deaths attributed to syphilis. Of these, five occurred in infants under 1 year of age who were afflicted with the congenital form of the disease. There is every reason to believe that if many of the deaths reported as due to cirrhotic and sclerotic conditions were attributed to their real cause—namely, syphilis—the number of recorded deaths from preventable diseases would be greatly increased.

Infant mortality.—Of the total deaths from all causes 938, or approximately 25.6 per cent, occurred in children under 1 year of age. Of these deaths 851, or 93.72 per cent, might be classed as preventable, as follows:

	Deaths.	Per cent of total deaths under 1 year.
Pneumonia.....	112	12.34
Diarrhea and enteritis.....	115	12.66
Whooping cough.....	34	3.74
Other acute communicable diseases.....	17	1.87
Other infections.....	40	4.41
Premature birth.....	164	18.06
Injuries at birth.....	18	1.98
Convulsions, congenital debility, and other like causes.....	351	38.66
Total.....	851	93.72

The recorded infant mortality rate of the State is 88, there having been 10,235 births registered during the 12-month period ended June 30, 1915, and 908 deaths in children under 1 year of age, exclusive of stillbirths.

Birth registration.—The number of births registered during the 12-month period was 10,235, exclusive of stillbirths, giving a birth rate for the entire State of 16. In certain of the counties, as, for instance, Burleigh, Dunn, Emmons, Golden Valley, Griggs, McIntosh, and Steele, the birth rate is very much higher, being over 20, and in one county, Golden Valley, reaching as high as 27.9. In the majority of counties, however, the birth registration is noticeably deficient.

Discussion.—After a careful examination of the death certificates on file it may be said in general that many of them are carelessly made out, necessary information is often missing, and not infrequently the cause of death is either not stated or is obscure or indefinite. The latter is explained to some extent by the fact that deaths, especially in infants, may occur in families living some distance from both doctor and registrar. Such children a physician often does not see at all.

The practice of issuing a burial permit and interring a corpse before a death certificate has been submitted is entirely too common in the State of North Dakota. In States having the best registration such a practice is not permitted. It is a direct violation of the law, and no doubt results at times in a failure through forgetfulness on the part of the undertaker to submit any death certificate at all. It is also questionable whether the city auditors and the clerks take sufficient interest in birth and death registration, for the reason that they have other duties to occupy their time. It is thought that perhaps some deputy registrars appointed from among the public-spirited women of the communities might result in better registration. It is also thought advisable to require that all places of interment within the State be licensed by the State board of health, and that such places be required to have a sexton or caretaker and to keep complete records of all bodies buried.

More responsibility should be placed on the parents in respect to the registration of births.

It is most essential that the State board of health be given a field force who may visit the localities, study the church records, records of the local cemeteries, and reports in the local newspapers, and by advice and instruction gradually educate the physicians and registrars and others in their obligations as regards the registration of births and deaths. If this does not produce the expected results, the board should then request the aid of the State's attorney. The registration act is very specific, and if enforced would bring the State into the registration area.

Believing that ministers are called to officiate at most burials, the State board of health has requested their assistance in having a death certificate properly made out and sent to the registrars, when it has not already been attended to. This is an excellent idea, and similar cooperation would be equally valuable in birth registration. This could be accomplished by ministers at the christening or other corresponding ceremony requiring evidence of previous registration of the birth of the child.

It is also necessary that someone be employed in the State board of health to devote his entire time to the registration of births and deaths. At present the force is absolutely inadequate.

Table of information relating to birth and death registration for the 12-month period ended June 30, 1915.

County.	Population.	Number of registrars.	Number of birth certificates.	Birth rate.	Number of death certificates.	Death rate.	Number of still-births.	Number of "No report" cards.	Number of physicians.	Number of licensed embalmers.
Adams.....	4,723	28	103	21.80	29	4.2	1	68	4	1
Barnes.....	18,706	48	352	18.80	111	5.9	12	99	19	6
Benson.....	12,705	42	234	18.41	50	3.9	4	61	17	4
Billings.....	3,250	6	47	14.46	10	3.0	.....	18	2	1
Bottineau.....	17,337	53	225	13.03	70	4.0	4	70	15	8
Bowman.....	5,041	23	36	7.14	.....	.....	1	9	5	3
Burke.....	9,997	33	149	16.37	22	2.4	2	52	8	2
Burleigh.....	14,157	42	326	23.02	138	9.7	4	74	21	7
Cass.....	40,436	59	584	14.40	391	9.7	21	119	50	14
Cavalier.....	15,811	45	202	10.59	77	4.8	3	32	13	3
Dickey.....	10,094	37	146	14.40	42	4.1	1	53	9	4
Divide.....	8,894	35	152	17.19	26	2.1	3	71	7	2
Dunn.....	8,156	7	204	25.01	52	6.3	5	12	4	2
Eddy.....	5,854	13	106	18.69	22	3.8	3	33	6	1
Emmons.....	10,323	12	244	23.60	31	3.0	3	9	7	1
Forster.....	6,054	13	121	19.60	17	2.8	4	39	6	2
Golden Valley.....	6,038	14	169	27.90	34	5.6	.....	27	5	2
Grand Forks.....	28,688	47	509	17.70	274	9.8	18	51	36	9
Griggs.....	6,567	23	149	22.60	23	4.2	5	49	6	3
Hettinger.....	7,711	24	105	13.69	39	5.0	.....	45	5	1
Kidder.....	6,943	13	58	8.30	17	2.4	1	6	4	1
LaMoure.....	11,453	36	282	24.69	72	6.3	4	23	14	4
Logan.....	7,637	15	159	22.50	56	7.9	5	10	2	.....
McHenry.....	16,950	47	179	10.56	49	2.9	3	55	11	7
McIntosh.....	8,623	7	232	25.10	72	8.9	4	.....	3	1
McKenzie.....	10,803	36	244	22.59	50	4.6	2	37	5	1
McLean.....	15,879	32	173	10.60	37	2.3	4	49	11	1
Mercer.....	6,790	10	123	18.10	40	5.9	1	2	3	.....
Morton.....	26,717	33	382	14.20	134	5.0	12	23	17	6
Mountain.....	11,135	38	249	22.39	47	4.2	3	86	7	3
Nelson.....	10,331	34	208	20.19	55	5.3	6	54	9	3
Oliver.....	4,058	1	60	14.70	21	5.0	1	.....	1	.....
Pembina.....	14,341	33	265	18.40	80	5.0	7	36	13	5
Pierce.....	9,703	25	156	16.10	68	7.0	3	27	10	1
Ramsey.....	15,070	40	305	20.29	118	7.8	8	75	16	5
Ransom.....	11,045	23	199	18.01	62	5.6	2	45	9	6
Renville.....	8,098	30	144	17.70	40	4.9	1	34	9	2
Richland.....	21,265	45	243	11.40	93	4.3	9	74	25	9
Rolette.....	9,664	16	99	10.30	23	2.8	3	3	5	5
Sargent.....	9,634	30	137	14.29	30	3.1	1	57	9	5
Sheridan.....	8,169	11	62	7.50	26	3.1	.....	.....	2	1
Sioux.....	2,135	.....	.....	.....	.....	.....	.....	.....	1	.....
Slope.....	4,999	12	40	8.40	16	2.2	.....	19	.....	.....
Stark.....	14,134	10	54	3.80	61	4.3	1	11	14	6
Steele.....	7,016	23	186	26.50	47	6.7	4	35	7	1
Stutsman.....	24,091	53	347	17.30	185	7.7	6	101	20	8
Towner.....	9,147	28	121	13.20	26	2.8	2	27	8	2
Traill.....	12,838	27	297	16.10	69	5.4	2	31	12	3
Walsh.....	29,373	49	272	13.30	114	5.6	4	55	16	7
Ward.....	28,968	63	384	13.60	109	6.0	5	74	30	8
Wells.....	13,204	23	151	11.40	48	3.6	.....	36	17	3
Williams.....	18,143	57	319	17.08	120	6.6	5	123	16	7
Total.....	636,741	1,514	10,235	.....	3,504	.....	203	2,192	571	188

EPIDEMIOLOGICAL ACTIVITIES.

The law gives to the State board of health ample authority to promulgate regulations and to perform the work required to control communicable disease; but the totally inadequate appropriation provided by the legislature to employ the necessary specialists in public health, together with the inadvisable separation of certain public-health functions from the State board of health, precludes the possibility of that body engaging in active operations except through the agency of the part-time health officers. The latter are busy practitioners of medicine who can ill afford to neglect their practices for the meager compensation allowed by the county.

The activities of the board of health have been confined to the promulgation of regulations. In fact, there has been more epidemiological work done by the public health laboratory and even by the food and drug commissioner than has been performed by the State board of health.

MORBIDITY REPORTS.

Requirements of laws.—Physicians or other persons are required to report immediately to the local board of health all cases of tuberculosis, typhoid fever, or any other communicable disease coming to their knowledge, and if the physician is the attending physician he is required to report not less than twice each week the condition of the patient so afflicted, together with the state of the disease.

It is also required that physicians report within 24 hours to the local board of health each of his patients who has died of a communicable disease.

Keepers of boarding houses, hotels, lodging houses, etc., are required to report any communicable disease occurring among their guests.

Physicians practicing in cities under the commission form of government are required to report in writing to the commissioner of public health all patients under their charge who are sick with smallpox, scarlet fever, diphtheria, typhoid fever, Asiatic cholera, or any other dangerous or contagious disease within 24 hours after the nature of the same is suspected. The report is to be made upon a form prescribed by the State board of health.

For failure to make such report there is provided a fine of not less than \$25 nor more than \$100, or imprisonment for not exceeding 60 days, or both.

Requirements of regulations.—Every case of smallpox, diphtheria, scarlet fever, measles, or whooping cough must be reported in writing within 24 hours by the attending physician or other person having knowledge of the existence of the disease to the local health officer. The name of the disease with the name and address of the patient must be given. Tuberculosis and typhoid fever must be reported in writing as soon as a diagnosis is made. The name of the disease with the name and address of the patient must be given.

Method of procedure.—County and city health officers are required to submit to the State superintendent of health before the 10th of the following month a summary of the communicable diseases reported to them for the previous month. These summaries contain information as follows: Date, name of person affected, address, sex, color, age, name of disease, by whom reported, and results.

Discussion.—The following table has been prepared from the morbidity reports received from county and city health officers and the death certificates submitted during the 12-month period ended June 30, 1915:

Disease.	Number of cases.	Number of deaths.	Death rate per 100,000.	Fatality rate per 100 cases.
Typhoid fever.....	385	46	7.2	12.0
Measles.....	767	28	4.4	3.6
Scarlet fever.....	452	16	2.5	3.5
Whooping cough.....	234	44	6.9	18.8
Diphtheria.....	419	23	3.6	5.5
Smallpox.....	560			
Pulmonary tuberculosis.....	153	188	29.3	
Pneumonia.....		300	47.0	
Malignant growths.....		198	31.0	

From the case fatality rates of typhoid fever, measles, scarlet fever, and whooping cough it can safely be assumed that many more cases of these diseases occur than come to the notice of the board of health. The mortality from whooping cough seems to be especially high. It is probable, however, that the mortality from this disease is actually greater than is usually suspected.

Tuberculosis is especially poorly reported.

Pneumonia and cancer are not notifiable diseases in the State of North Dakota.

The death rates from the various communicable diseases are not high, but it must be kept in mind that the death registration is very deficient and that an increase in the total registration would necessarily mean an increase in the deaths reported from communicable diseases.

At present the morbidity reports are of little utility to the State. The lack of organization in the State board of health makes it impracticable to give the proper study to such reports so that preventive measures may be applied. Likewise, under the present system the work done in the public health laboratory of the university is of little utility in a preventive way, the State board of health not being in close touch with the results obtained and, unfortunately, not being in a position to make the best use of such results, even though notified.

THE CONTROL OF DISEASE.

Requirements of laws.—In addition to the law giving the State board of health the power to make regulations, institute measures to eradicate and prevent the spread of disease, and to exercise supervisory control over local boards of health, certain other laws directed toward prevention of disease have been enacted and are summarized as follows:

The removal or transportation of any person suffering with a communicable disease or any body dead of a communicable disease without a certificate from the local or State board of health is prohibited.

Each parent or guardian having the care, custody, or control of any minor or other person is required to cause such person to be vaccinated.

School officials, parents, or guardians are prohibited from permitting any child suffering from scarlet fever, diphtheria, smallpox, whooping cough, measles, or other communicable disease, or any child residing in a house where such disease exists or has recently existed to attend any public or private school without the permission of the local board of health.

It is unlawful to allow dead bodies to remain unburied for a period longer than four days, or if such body has died of a communicable disease, longer than 24 hours. The local board of health may give a permit to extend this time. Bodies dead of a communicable disease must be disinfected when directed by the local board of health, and if the body remains unburied over 24 hours it must be inclosed in a tightly sealed metallic coffin and the funeral must be private. The law further specifies conditions under which such bodies may be removed or transported.

Ophthalmia neonatorum.—All birth certificates, in addition to the other data, must contain the question, "Were precautions taken against ophthalmia neonatorum?" and it is made unlawful for any attendant at a birth to collect for professional services unless this question is properly answered.

It is made a duty of every attendant upon a birth to examine the eyes of the newborn, and if there is any reason for suspecting a disease of the eyes, to apply a recognized prophylactic treatment.

If one or both eyes of an infant have become inflamed, swollen, or reddened, or show any unnatural discharge within two weeks after birth and no legally qualified physician is in attendance, it is made the duty of the parent or other person having the care of the infant to report the fact in writing within six hours to the health officer. This procedure is not required from recognized hospitals.

The health officer is required to place the infant in charge of a legally qualified physician for treatment or, if an indigent, in charge of the township or city physician.

For violation there is provided a fine of not less than \$10 nor more than \$50.

Tuberculosis.—When any local antituberculosis society considers it necessary to secure the services of a visiting nurse or to disinfect any building, room, etc., which has been occupied by a case of tuberculosis, it may report, with recommendations, to the chairman of the board of health and to the board of county commissioners. The latter is authorized to appropriate money out of the county funds to pay for the necessary disinfection, the services of visiting nurses, or medical attention or advice in preventing the spread of tuberculosis. The county commissioners are also authorized to cooperate with neighboring counties to establish homes or hospitals for incurable tuberculosis patients.

There is established by law a State tuberculosis sanitarium, which is located at Dunseith, in Rolette County. The law provides for its control by the State board of control, and also for the necessary officials to manage the institution. Tuberculosis in all its stages is cared for, but the incurable must be kept separate from the curable.

Each patient is required to reimburse the institution for the cost of his maintenance, or any society may defray such expense. Where the patient is an indigent a charge of \$7 per week is made against the county from which the patient came. The law further provides for the acceptance of gifts or donations, the construction of cottages by fraternal societies, etc.

Regulating marriages.—Marriage of a woman under the age of 45 years or a man of any age (except he marry a woman over the age of 45 years) is prohibited when one of the contracting parties is a common drunkard, habitual criminal, epileptic, imbecile, feeble-minded person, idiot or insane person, or person who is afflicted with hereditary insanity, with pulmonary tuberculosis in its advanced stages, or any contagious venereal disease.

No clergyman or other person authorized to solemnize marriages is permitted to perform a marriage ceremony between persons afflicted as above.

Before a marriage can take place the contracting parties must file with the county judge an affidavit to the effect that they are not feeble-minded, imbeciles, epileptics, insane, drunkards, or afflicted with tuberculosis in its advanced stages, and in addition the affidavit of the male applicant must show that he is not suffering from venereal disease.

Physicians are entitled to a fee of not to exceed \$2 for each examination made under the law.

Public drinking cups.—The use of public drinking cups on railroad trains, stations, or in public, parochial, or private schools or other educational institutions, and other public buildings of the State of North Dakota is prohibited.

For violation a penalty is provided of a fine not to exceed \$25 for each offense.

Violation of the health laws.—For violation of any health law or any rules or regulations made by any board of health or health officer or by any public officer under the authority of the health laws, and where no punishment is otherwise prescribed, there is provided a fine of not exceeding \$2,000 or imprisonment not exceeding one year, or both.

Every person who willfully opposes or obstructs any health officer, or physician charged with the enforcement of health laws, in performing any regular duty is guilty of a misdemeanor.

Requirements of regulations.—The regulations which have been promulgated by the State board of health for the purpose of controlling communicable diseases are summarized as follows:

In the case of smallpox, diphtheria, or scarlet fever the patient must be adequately isolated in the house or removed to an isolation hospital. The house must be placarded. Contacts must be rigidly quarantined until either the removal or isolation of the patient or until they have been disinfected, together with their clothes and that part of the building not occupied by the patient. They can not carry on their vocations without permission from the health officer.

It is forbidden to employ teachers having pulmonary tuberculosis in the public schools. Parents or guardians must not permit any child afflicted with pulmonary tuberculosis to attend any school or other public place.

Health officers must not give certificates releasing contacts from quarantine until after the period of incubation has elapsed, which in the case of scarlet fever is regarded as 7 days or longer; in the case of diphtheria as 4 weeks or until negative cultures have been secured from the throat and nose; and in case of smallpox for those never having had the disease and who have no well-marked vaccination scar as 14 days from date of last exposure. All who have been exposed must be vaccinated or revaccinated at once. Those who have had smallpox or have a typical vaccination scar may be released after disinfection. The health officer at his discretion may grant restricted liberty to any contact after disinfection and vaccination.

No child is permitted to enter any school until evidence of successful vaccination has been produced.

A health officer is prohibited from releasing any contact from quarantine until he is satisfied of the efficacy of the isolation, disinfection, vaccination, or the degree of immunity to the disease, and is satisfied also that such contact is not dangerous to the community.

The health officer is authorized to quarantine all suspected cases of communicable diseases until the correct diagnosis is made.

The minimum period for detention for the communicable diseases is as follows: For scarlet fever, until 5 days after the desquamation is complete, but in no case less than 30 days from the beginning of the disease; for diphtheria, 30 days, except where negative cultures are secured; for smallpox, until 5 days after the scabs have disappeared,

but in no case less than 21 days from the onset of the disease; for measles, 2 weeks; and for whooping cough, 1 week after the paroxysmal cough has ceased.

In typhoid fever the patient must be isolated, although absolute quarantine is not necessary. The stools must be disinfected. Certain disinfectants are recommended in the regulations.

In tuberculosis the patient must be instructed as to the disposition of the sputum and told that he should sleep alone in a well-ventilated room.

Attendants, physicians, health officers, and clergymen may be permitted to enter quarantined rooms by taking proper precautions to prevent spreading the disease.

No person exposed to smallpox, diphtheria, or scarlet fever may enter a public conveyance without a certificate from the health officer.

No room or building in which there has been any of the diseases mentioned in these regulations may be let until after disinfection and until a certificate is secured from the health officer. This provision also applies to rooms in hotels and lodging houses.

In case of a death from smallpox, diphtheria, scarlet fever, measles, and whooping cough no public funeral is permitted and the coffin containing the body may not be taken into any church or public building, or deposited in a public morgue.

Milk may not be sold from premises where any of the above diseases exist, nor shall it be sold if handled by any person living on such premises or exposed to infection, unless such person receive a certificate from the health officer.

The regulations specify methods for the disinfection of articles and rooms as well as of the patient.

Bodies of persons having died of any of the above diseases must be wrapped in a sheet soaked in a solution of corrosive sublimate, 1:500.

No isolation hospital may be established within 200 yards of any building.

When the superintendent of the State board of health is of the opinion that smallpox, diphtheria, scarlet fever, measles, whooping cough, or typhoid fever, is epidemic or threatens to become epidemic in any locality he may, as executive officer of the State board of health, take all necessary steps to prevent the spread of the disease and to eradicate it, including enforcement of quarantine, isolation, vaccination, disinfection, and the closure of schools.

It is the duty of a local health officer to disinfect, or cause to be disinfected, anybody dead of smallpox, diphtheria, scarlet fever, or any other dangerous communicable disease.

The use of the common drinking cup is prohibited on all vehicles of common carriers, in waiting rooms, hotels, restaurants, boarding houses, stores, schools (public and private), State institutions, or other public places. The same applies to the common towel.

The school officials, parents, and guardians are authorized to prevent the attendance at school of all children suffering from smallpox, scarlet fever, diphtheria, measles, chicken-pox, tuberculosis, infantile paralysis, erysipelas, whooping cough, mumps, scabies, pediculosis, ringworm, trachoma, or any other communicable disease, without permission from the local health officer or school inspector.

The period of exclusion from school for children having the common communicable diseases is as follows: Scarlet fever, six weeks or longer if redness of the throat, nasal discharge, or other sequelae persist; measles, two weeks from the date of the appearance of the eruption; German measles, one week from the date of the appearance of the eruption; chicken-pox, until all scabs have disappeared; diphtheria, one week after securing the second negative culture from the nose and throat; whooping cough, eight weeks from the disappearance of the characteristic cough; mumps, three weeks or longer if swelling persists; pediculosis, until all parasites and nits are gone; ringworm, scabies, and impetigo, until examination reveals successful treatment; smallpox, after complete desquamation, but at least four weeks must have elapsed from appearance of eruption.

Discussion.—It has already been pointed out that the State board of health is not in a position to take any active part in the enforcement of these regulations, but must depend entirely on the local health officers, who in turn, in rural communities at least, depend to a very large extent upon the cooperation of the practicing physicians. There is no intention to minimize the efforts of the local and State officials or others who have been attempting to accomplish something toward the control of disease. The fact remains, however, that preventable diseases are all too common in the State, and deaths from these diseases too frequent. This merely indicates the lack of organization, without which productive results of a permanent nature can not be expected.

Tuberculosis.—It would perhaps not be far wrong to estimate that there were 5,000 cases of tuberculosis in the State of North Dakota, one-half of which were open cases and a menace to the community. During the year ended June 30, 1915, however, there were but 153 cases and 188 deaths reported to the health department.

The State institution, located at Dunseith, for the care of tuberculosis is built on the cottage plan and can accommodate only 60 patients. Both incipient and advanced cases are admitted. The advanced and incipient cases are segregated from each other.

There is also in the State an antituberculosis society, which during the coming year will receive financial assistance from the State to the extent of \$1,500. Except for this aid from the State the society is maintained entirely by money received from private sources. Its activities are legitimately those of a State health department and of such great importance to the community that the State should recognize its obligation to its citizens, take over these activities, and place them in a well-organized health department capable of making the necessary investigations and exercising the proper advisory and supervisory control over the disease. Money appropriated to a properly equipped health department would bring greater returns.

While the treatment of incipient cases of tuberculosis and the education of the people have their value, no great progress can be made in the eradication of the disease until means is provided for the isolation of all cases discharging tubercle bacilli in the sputum. Each of these is a focus of infection and the means of spreading the disease. Recent intensive surveys have indicated that the majority of individuals suffering from tuberculosis have contracted their infection from intimate contact with previously existing cases.

Each county is given the authority by statute to combine with other counties for the purpose of erecting hospitals for the care of the tuberculous, and it is most necessary that the county commissioners make immediate use of their authority in this respect and thus take an active part in the fight against tuberculosis. The

expense will thus be subdivided, and the patients may be isolated nearer to friends and relatives. When provision is made to isolate all open cases of tuberculosis, to pasteurize the milk supply, and to supervise and educate those suffering from the incipient form of the disease, as well as healthy people, tuberculosis will cease to be a serious problem.

Communicable diseases on vessels.—Because of the steamboat traffic on the Missouri River and the possibility of a person suffering from one of the communicable diseases disembarking, certain laws have been enacted to prevent the introduction of infection in this way. It has, however, not been thought necessary to summarize these laws in this report.

Diagnostic Laboratory.

The public health laboratory from its inception has been a part of the University of North Dakota, coming under the control of the trustees of that institution. It is under the immediate supervision of a director. The main laboratory is located in one of the university buildings at Grand Forks, and there are two branch laboratories, one at Bismarck and one at Minot, each of the latter being in charge of an assistant bacteriologist. At the main laboratory there is employed an assistant bacteriologist, one pathologist (part time), one technical assistant, and one stenographer (part time). For the maintenance of these three laboratories there is appropriated \$8,000 per annum.

The laboratory was established for the purpose of assisting the physicians and health officers in the diagnosis of disease, especially of the communicable diseases. As a public health laboratory its work includes the examination of cultures for diphtheria; of sputum for tubercle bacilli; of blood for the Widal reaction; of smears for pus organisms, especially gonococci; of animal's brains for the evidence of rabies; of stools for parasites; the bacteriological and chemical analysis of milk and water; and the examination of tumors for malignancy. The latter is certainly an important part of the work of a public health laboratory inasmuch as an early diagnosis is necessary in order to prolong life, which, after all, is the ultimate result to be attained by the worker in public health.

In addition to the above the laboratory is required by law to perform a large amount of clinical laboratory work, including the examination of stomach contents, blood counts, urine analysis, tissue sectioning, and the like. All tissue and tumor work is done in the main laboratory. This laboratory will soon be in a position to perform the Wasserman reaction as a routine measure.

During the year ended June 30, 1915, there were made 8,836 examinations. On a basis of \$8,000 per year for maintenance, this means a

cost per examination of approximately 90 cents. Of the total examinations, 3,863 were made in the main laboratory, 3,691 at the Minot branch, and 1,282 at the Bismarck branch.

The work done in the laboratory is highly efficient; but the results obtained can not be of great value from the public health standpoint until utilized by the epidemiologists of a properly organized health department. The epidemiologist, who is the active agent in the field, and the bacteriologist must work in close cooperation, and it is essential, therefore, that the laboratory be a part of the bureau of epidemiology of the health department. The directors of the laboratory, past and present, have done some excellent work along the lines of stream pollution, pointing out the dangers and encouraging localities to provide proper methods of sewage disposal. Good work has also been done in reference to pure water supplies and there is no doubt that the laboratory must be given much credit for the part it has played in securing better sanitary conditions. Up to the present time, however, little has been accomplished compared with what is necessary.

The officials in charge of the main as well as the branch laboratories devote part of their time to a general supervision over the milk supply or the water supply, or both, of the cities in which they are located.

The laboratory has issued several instructive popular bulletins relating to the subjects of rabies, tuberculosis, pure water, sewage disposal, and the extermination of flies.

A two years' course preparatory to the study of medicine is given at the University of North Dakota. The public health laboratory is therefore of great utility to the university, furnishing a means of teaching bacteriology to its students. However, a transfer of the control of this laboratory to the health department would not mean a change in its location, and material submitted for examination would be of equal value for teaching purposes.

PUBLIC HEALTH ENGINEERING.

Requirements of laws.—The only law which could be found bearing on the subject of sewage disposal is summarized as follows:

City councils or boards of trustees in incorporated villages are authorized to establish and maintain a general system of sewers, in such manner and under such regulations as the council may deem expedient. Sewage may be discharged into any river, but always below any dam that may be located within the corporate limits. Where no river is available, sewage may be discharged into a lake, coulee, or slough, in which case a septic tank must be employed for sewage from closets, kitchen sinks, or for anything carrying objectionable matter.

No provision is made for submitting the plans for sewerage systems to the State board of health for approval as regards the feasibility or efficacy of the methods adopted.

There is no law providing for the purity of water supplies, garbage disposal, or the disposal of trade wastes.

Discussion.—The State has not paid sufficient attention to this important phase of public health. The State board of health, which is responsible for the prevention of disease, has not been in a position to carry on work along these lines. A few communities have worked out the problem locally with more or less satisfaction. In its solution they have received aid from the public health laboratory, which has been making bacteriological and chemical examinations of water, and through investigations and publications has attempted to remedy some of the evils present. The director of the State laboratory and his assistants in charge of the branch laboratories have been detailed to exercise a general supervision over the water supplies of the cities in which they are located.

Water analyses have also been made in the laboratory of the commissioner of food and drugs, and through such analyses and the agency of his field force he has at times been instrumental in combating local outbreaks of typhoid fever.

In fact, it would seem that the State legislature has provided other State organizations with the money and men to carry out measures to prevent the spread of disease, while the State board of health, which was organized for that purpose and which morally has to assume the responsibility for the continued presence of preventable diseases within the State, has been neglected.

There are a number of places in the State where a thorough study of the water supply and the methods of sewage disposal should be conducted by a capable sanitary engineer, so that the communities may without waste of money provide themselves with a safe water supply and an efficient method of sewage disposal.

It would be the duty of the sanitary engineer of the State health department to make such investigations without cost to the localities, and he should have under his control a water and sewage laboratory in which to carry on the scientific part of the study. Likewise the methods of garbage collection are also in need of careful study, so that a system which is cheapest and most efficient for the locality may be instituted. The State of North Dakota is rapidly growing in population, and each year its public health engineering problems become of greater importance and more difficult to solve.

CONTROL OF THE MILK SUPPLY.

The laws enacted for the purpose of maintaining the purity of milk do not differ materially from those of other States and therefore will not be summarized here. Special provisions are made for applying the tuberculin test to dairy cattle and to cattle imported from other States.

The laws relating to the milk supply have been placed for their enforcement in the hands of the State food and drug commissioner and the State dairy commissioner. County health officers are also given authority to operate under State law, a provision inserted at the suggestion of the food and drug commissioner. It is a wise provision and will enable the State health department, under the proper organization, and the food and drug commissioner to cooperate to the fullest extent.

In the event of the formation of a district health organization, the district health officers should also be granted this authority. They could be made very active agents in the enforcement of laws to preserve the purity of milk.

Several cities have organized milk-inspection divisions which are carrying on with success activities directed toward the improvement of the milk supply.

The State food and drug commissioner will appoint local milk inspectors as his agents to serve without pay from the State. In this way his available force in the field is increased and better cooperation from the locality is secured, while at the same time the locality is benefited in that it may apply the State law to milk coming from places outside of its jurisdiction. This attitude on the part of the commissioner of food and drugs shows a most commendable desire to cooperate with other officials in the enforcement of law. Certain other States might well copy the system to their advantage.

LOCAL HEALTH AUTHORITIES.

Requirements of laws.—The laws relating to the formation and duties of local boards of health and the appointment and duties of local health officers are summarized as follows:

Local boards of health are authorized to remove for purposes of isolation any case of communicable disease, or, if the patient is not in a condition to be removed, to take such other action as may prevent the spread of the disease. The State board of health must be notified immediately of the existence and nature of the disease and measures adopted to prevent its spread. Local boards of health are authorized to provide temporary isolation hospitals, and all such places and the inmates therein are subject to the control of the local board of health. Local boards of health are also authorized to destroy infected clothing and allow reasonable reimbursement, or to provide necessary means for disinfection.

In order to prevent the spread of disease, local boards of health are authorized to employ the necessary physicians or other persons and provide such articles as may be necessary for the maintenance, welfare, and comfort of patients.

All such expenses must be paid, after proper certification, by the local government, either county, township, or city.

A patient, if able to pay, is required to reimburse the local government the cost of his maintenance, but if he is an indigent the expenses are paid by the county.

For violation of any provision of law by any health officer or member of board of health, or by any other person there is provided a fine of not less than \$10 nor more than \$50, or by imprisonment not to exceed 30 days, or both.

County boards of health.—The county board of health is composed of three members, one of whom is president, one vice president, and one the "superintendent" of public health. The State's attorney is ex officio president of the board. The county superintendent of schools is ex officio vice president. The "superintendent" of public health is appointed by the county commissioners. The qualifications required for the county superintendent of health are that he be learned in medicine and that he hold license to practice medicine in the State.

The members of the county board of health hold their office for one year and until their successors are elected and qualified.

The first meeting of the board occurs within 30 days after the appointment of the county superintendent of health and thereafter as often as once in every three months.

The county boards of health are given the power, within their respective counties, outside the corporate limits of cities having a city board of health and subject to the supervisory control of the State board of health and its secretary, to supervise all matters relating to the preservation of life and health of the people in the county, including water supplies and sewerage systems and the maintenance of quarantine, which it may declare, relax, modify, or abolish; to remove or abate any public or private nuisance; to isolate, kill, or remove any animal affected with a disease that may be communicated to human beings; to make and enforce ordinances or rules meeting any emergency, or when the local board of health has neglected or refused to act with promptness and efficiency or when no such board has been established. The law further provides that all expenses incurred in carrying out the duties of the county board of health must be paid the same as other county expenses.

The president presides at the meetings and in his absence the vice president performs the same duties. The county superintendent of health acts as secretary of the board and keeps records of all its proceedings, reports monthly to the State superintendent of health such proceedings as well as other official duties performed by him. He is also required to report immediately to the State superintendent of health whenever any communicable disease appears among persons or animals, or whenever the health of persons or domestic animals is endangered. He is likewise required to report before the 10th day of each month to the secretary of the State board of health the name and address of each patient suffering from a communicable disease with the name of person reporting same. He is required to superintend, subject to the supervision and control of the State board of health, the carrying out of all duties required of county boards of health; to exercise supervisory control over all local boards of health within the county; to furnish—at the expense of the county—blanks for the reporting of notifiable diseases to township, village clerks, and physicians; to investigate public milk supplies; to enforce cleanliness in schools; to investigate overcrowded, poorly ventilated, and insanitary school buildings; to carry out orders of the county board of health when the local board of health refuses to act; and to make sanitary inspection. He is held responsible for the thorough enforcement of the laws, regulations, and rules for the protection and conservation of public health.

The president and vice president each receive \$3 per day when actually engaged in the performance of their official duties and mileage amounting to 5 cents. The county superintendent of health receives from \$300 to \$600 per year, at the discretion of the county commissioners. In addition he also receives \$5 per day for every day or fraction thereof that he may be actually engaged in the performance of his official duties, not including work confined to his office, and mileage at the rate of 5 cents.

Township boards of health.—The board of health of the township is composed of the supervisors of the township and the trustees of each incorporated village, who, within their respective township or village, exercise, under the supervisory control of the county superintendent of health, all the powers necessary for the preservation of public health.

The board of health may examine into nuisances, sources of filth, and causes of sickness and make such temporary regulations regarding the same as it may deem necessary and must immediately report its action to the county superintendent of public health, who then investigates the matter and gives the board of health specific instructions.

For violation of any order of the board of health duly published there is provided a fine of not exceeding \$100 or imprisonment not exceeding three months.

The board has the authority to abate nuisances, to enter infected premises or vessels, to quarantine infected persons, to provide a nurse and other necessities for the patient, to provide isolation hospitals.

Boards of health in incorporated villages.—The board of trustees is empowered to construct and keep in repair culverts, drains, sewers, catch basins, manholes, cess-pools; to regulate the construction and use thereof; to declare what constitutes a nuisance and to abate the same; to impose the necessary fines relative thereto; to take such other means for the preservation of health and regulate, restrain, and prohibit the running at large of dogs and to impose a tax or license not to exceed \$2 on each male dog and \$3 on each female dog; to establish and regulate markets and build market houses; to direct the location and regulate the management and construction of packing houses, smokehouses, renderies, and slaughterhouses; and prohibit any offensive or unwholesome business or establishment within or less than 1 mile from the limits of the corporation; to compel the owner of any grocery, cellar, stable, pigsty, sewer, or other unwholesome or nauseous house or place to cleanse, abate, or remove the same, and regulate the location thereof.

City boards of health.—The city board of health is composed of the city engineer and the health officer and four aldermen designated by the mayor.

The city health officer is appointed by the mayor and confirmed by the city council and holds office for two years. When the State board of health is satisfied that the city health officer is not performing his duties, it may report the case to the city council, and at the next meeting the mayor must declare the office vacant and appoint another physician to fill the unexpired term. The health officer is secretary and executive officer of the board.

The board meets regularly once a quarter, and special meetings may be held at the call of the president and secretary.

The president and vice president perform the usual duties pertaining to their offices. The secretary keeps the proceedings of the board; determines whether all city ordinances, State laws, and regulations are being enforced; instructs physicians as to the proper method of reporting diseases; furnishes such blanks as may be prescribed by the State board of health; keeps data relative to the occurrence of communicable diseases; and reports by the tenth day of each month all communicable diseases to the State board of health, and such other data as may be required by that board.

The board of health is authorized to examine into all nuisances, sources of filth, and causes of sickness and to make the necessary regulations for the protection of public health and safety of the inhabitants.

For violation of any such regulations there is provided a fine of not exceeding \$100 or imprisonment in the county jail for not exceeding 30 days, or both.

All regulations made by the board of health must be properly published in some newspaper or posted in five separate places. Boards of health are authorized to order the abatement of any nuisance within 24 hours. If such order is not complied with, the board of health may remove the nuisance and charge the cost against the owner or occupant of the premises on which the nuisance occurred.

When permission to enter any building on the discharge of official duties is refused, a complaint is made to the justice of the peace, who is required to issue a warrant directed to the sheriff, or other peace officer, commanding him to take sufficient aid and at least one member of the board of health and to have the nuisance abated.

Commission form of city government.—In the commission form of government the commissioners have power to appoint or discharge for cause all subordinates. The commissioner of health is appointed as a subordinate in the department of streets and improvement. His salary is fixed by the commissioners and he has the authority to appoint his assistants. He is also given the authority granted by law to boards of health and to prepare rules and regulations for the preservation of public health. Such regulations must first, however, be approved by the commission before they can be enforced.

He is required to recommend to the commission such sanitary measures to be taken as may be necessary. He is given authority to inspect premises and to issue the necessary orders to abate nuisances or to correct conditions dangerous to the public health, and in the event that an order is not obeyed, to do the necessary work and charge the expense against the owner.

The commissioner of health is required, in addition to the other duties imposed upon him by the commissioners, to make such reports to the State board of health and to perform such other duties as may be required of health officers by statute.

Peace officers are required to render every assistance to the commissioner of health and the chief of police is authorized to detail one or more policemen, upon the requisition of the commissioner of health, to serve notices and perform such other duties as the commissioner may require.

For refusing to permit the health officer or any of his agents to enter any building at any time in the discharge of his official duties there is provided a fine of not less than \$10 nor more than \$100.

Discussion.—In each county there has been appointed a health officer who, with few exceptions, receives the minimum salary allowed by law, namely, \$300. This compensation is hardly sufficient to justify the exercise of much energy on the part of a health officer, as he must necessarily depend upon the practice of medicine for his living.

Health organization in the counties is markedly deficient. The work of the county health officer is usually confined to the supervision of the quarantinable diseases, which is not infrequently done by telephone through the assistance of other practicing physicians in the county. The county health officer also receives the morbidity reports from the physicians and transmits them to the State superintendent of health. A few other activities are occasionally engaged in; for instance, in Barnes County the county health officer is carrying on a medical inspection of schools. In Cass County there is no such inspection, but a school nurse has been employed by the educational authorities. She receives \$90 per month.

It can be said that the county health officers are men of high qualifications as physicians and capable of giving efficient services as health officers provided they receive sufficient remuneration to enable them to give their full time to the work. The same can be said of the health officers in the various cities visited. These men were receiving from \$200 a year, as in Jamestown, to \$900 a year, the salary paid in Fargo. In general the activities being carried on are not extensive, although in the larger cities there is some semblance

of organization. In Fargo there are to be found a system of garbage collection, a city laboratory, a system of school inspection carried on by the bureau of education, a milk-inspection division, a modern water-purification plant, and a 50-bed isolation hospital. There is also a nurse, employed by the associated charities, who cooperates with the health officer.

In Grand Forks the policemen act as sanitary inspectors. There is an eight-bed isolation hospital, a municipal slaughterhouse, and a system of garbage collection, the garbage being disposed of in an incinerator. A food inspector, a milk inspector, and a dairy inspector are employed by the health department. A social service nurse, who cooperates with the health officer, is employed by the associated charities and a school nurse by the board of education. The director of the State laboratory is also employed by the city to supervise the system of water purification.

Better organization in all of the communities will no doubt come in time. At present the cities are not large enough to warrant the employment of a full-time health officer. However, in every city of 5,000 inhabitants or over the part-time health officer should have at least one inspector trained in sanitary science as an assistant. In cities of under 5,000 a trained sanitarian may act as health officer.

In the counties it would seem better to work under the present system, and in addition to divide the State into not less than six districts, a full-time district health officer to be placed in each. This officer would be actively engaged in working out the different health problems in his district, receiving from local health officers such assistance as they could give, lending them moral support, and exercising a general advisory and supervisory control over them. The district health officers should be directly responsible to and under the control of the State board of health.

Public health activities carried on in cities visited.

City.	Population.	Appropriation to health and sanitation.	Health officer (salary per annum).	Number of employees, exclusive of health officer.	Activities of health department.								Other activities.		Water supply.	Sewerage system.	Sewerage disposal.			
					Quarantine and disinfection.	Milk inspection.	Dairy inspection.	Food inspection.	Sanitary inspection.	Garbage.			Isolation hospital (number of beds).	Diagnostic laboratory.				Health supervision of schools (bureau of education).	Social service nursing (associated charities).	
										Collection.	How paid for.	Disposal.								
Fargo.....	20,549	\$22,850	1 \$000	2	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.....	Health fund.	Dumped and burned.	50	Yes.	Yes.	Yes.	Yes.	Red River rapid sand filtration and hypochlorite treatment.	Yes.	Red River; untreated.
Grand Forks.....	13,554	8,000	1 400	216	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.....	do.....	Incinerated.	8	(2)	Yes.	Yes.	Do.	James River septic tank.	Yes.	Do.
Jamestown.....	5,506	.....	1 200	.....	Yes.	.....	.....	.....	.....	Private collection.	.....	Dumped.....	7	(2)	.....	.....	Driven wells; no treatment.	Yes.	James River.
Bismarck.....	6,344	1,750	1 400	1	Yes.	Yes.	Yes.	.....	.....	Yes.....	By householder.	do.....	None.	(2)	.....	.....	Missouri River sedimentation.	Yes.	Irrigation.
Mandan.....	4,142	900	1 300	2	Yes.	Yes.	Yes.	.....	.....	Yes.....	Health fund.	do.....	None.	(2)	.....	.....	do.....	Yes.	Heart River; untreated.
Valley City..	4,783	300	1 300	.....	Yes.	Yes.	Yes.	.....	.....	Private collection.	.....	do.....	6	(2)	.....	.....	Driven wells; no treatment.	Yes.	Shenandoah River; untreated.
Minot.....	10,053	.....	1 600	.....	Yes.	.....	.....	.....	.....	Yes.....	.....	do.....	6	(2)	Yes.	.....	Mouse River rapid sand filtration and hypochlorite treatment.	Yes.	River; untreated.
Devils Lake.	4,525	800	1 300	1	Yes.	Yes.	Yes.	Yes.	.....	Private collection.	.....	do.....	6	(2)	.....	.....	Driven wells; no treatment.	Yes.	Lake bottom; untreated.

1 Part time.

2 Includes policemen who act as sanitary inspectors.

3 Use State laboratory.

Public health activities carried on in counties visited.

County.	Population.	Expenses, health and sanitation, 1915.	Health officer, salary per annum.	Quarantine and disinfection.	Health supervision of schools.	Other activities.
Cass.....	40,436	\$3,059.40	\$300.00	Yes.....	None.....	None.
Grand Forks..	28,658	1,400.00	300.00	Yes.....	Yes: by nurse, bureau of education..	1 o.
Stutsman.....	24,091	2,000.00	500.00	Yes.....	None.....	Do.
Burleigh.....	14,157	550.00	300.00	Yes.....	.....do.....	Do.
Morton.....	26,717	1,187.00	300.00	Yes.....	.....do.....	Do.
Ward.....	28,088	4,175.00	480.00	Yes.....	.....do.....	Do.
Barnes.....	18,709	807.17	300.00	Yes.....	Yes: by county health officer.....	Do.
Ramsey.....	15,070	500.00	300.00	Yes.....	None.....	Do.

HEALTH SUPERVISION OF SCHOOLS.

In a few instances only does one find any health supervision maintained over the children of the public schools. When such is observed it is usually found to be incomplete in that the services of either a physician or a nurse may be employed, but rarely the services of both.

Requirements of laws.—The law bearing on the subject of the employment of medical inspectors, together with other laws relating to schools and public health, is summarized as follows:

Authority is given to school boards, whenever petitioned by a majority of persons having children attending the schools of the district, to employ physicians as medical inspectors. It is the duty of such medical inspectors to examine at least once a year all school children, except those presenting a certificate of health from a licensed physician. Proper record must be kept for each child and a copy submitted to the superintendent of schools. Parents must be notified of the physical defects of their children with recommendations for conserving the child's health.

Medical inspectors of schools must cooperate with the State or local health officers in dealing with communicable diseases.

Local superintendents of schools are required to cooperate with school boards in promoting medical inspection. Blanks and other supplies must be furnished by the school board.

All plans and specifications of buildings to be used, in whole or part, as public-school buildings must be submitted to the State superintendent of public instruction for his approval before the buildings can be erected. The plans and specifications must show in detail the system of ventilating, heating, and lighting. No plans may be approved unless there is provided at least 12 square feet of floor space and 200 cubic feet of air space for each pupil in each study or recitation room. Light must be admitted from the left or from the left and rear of class rooms and the total light area must, unless strengthened by the use of reflecting lenses, be equal to at least 20 per cent of the floor space. All ceilings must be at least 12 feet in height. The ventilating system must be such that there will be at least 30 cubic feet of pure air every minute per pupil, warmed to maintain an average temperature of 70° F. during coldest weather, and the facilities for exhausting the foul air must be positive and independent of atmospheric changes. All public-school buildings must be kept clean and free from offensive smells arising from drains, privies, etc., and they must be provided with sufficient number of water-closets or other contrivances properly ventilated.

All toilet rooms must have outside ventilation and windows permitting free access of air and light.

When the county superintendent of schools reports to the county board of health that any school building or its outhouse is in an insanitary or unsafe condition, or that any pupil is alleged to be defective in mind or body, the board of health shall investigate and direct the school board to take the necessary action.

DISSEMINATION OF INFORMATION.

The State board of health publishes quarterly a 12-page bulletin, containing statistical data for the previous three months and original or compiled information of scientific and popular interest bearing on public health. About 1,925 copies of each issue of this bulletin are distributed to health officers, physicians, boards of health, embalmers, etc.

A biennial report is made to the governor.

The superintendent of public health has purchased at his own expense an interesting moving-picture film telling an instructive story of a man whose parents neglected to have his birth registered. It is a story with a moral and should be of great educational value. This film is loaned to the different cities, arrangements being previously made by the local health officer to have it exhibited in the local moving-picture houses. To show it requires about 15 minutes, and the only cost to the local officials is the payment of expressage, a matter of some 75 cents.

SANITATION OF HOTELS AND OTHER PLACES.

In order to maintain the hotels in a good sanitary condition, there is appointed by the governor a hotel inspector, who serves for a period of two years and who is required to inspect every hotel at least once each year. His salary is \$1,800. He is also entitled to traveling expenses. His reimbursement is paid from fees collected, which vary from \$2 to \$20, depending on the number of sleeping rooms in the hotel inspected.

This inspector should be placed under the administrative control of the State health department, as his work is closely associated with the sanitary problems of the State.

Requirements of laws.—The laws bearing on the sanitation of hotels, food-producing establishments, etc., are summarized as follows:

Hotel inspection.—Every hotel must be well drained, constructed, and plumbed according to established sanitary principles; must be kept clean and in a sanitary condition, and free from effluvia arising from any sewer, drain, privy, or other source within the control of the owner, manager, agent, or other person in charge; and must be provided with properly screened water-closets or privies for the separate use of males and females. These water-closets or privies must be disinfected as often as may be necessary to keep them at all times in a sanitary condition.

All bedrooms must be kept free from vermin and the bedding must be clean and sufficient in quantity and quality; all sheets must be at least 8 feet in length, and each guest must be furnished with two towels. In case bedrooms are carpeted the carpet thereon must be taken up and thoroughly cleansed at least once each year.

No rusted tin nor iron vessel or utensil may be used in cooking food, and all foodstuffs must be kept in a clean and suitable place, free from dampness and contact with dirty water. The floors, closets, cupboards, and walls of all kitchens must at all times be kept free from dirt and no dust or grease be allowed to collect thereon. A metal container must be provided to hold ashes where such ashes are stored in or around the hotel building. In all cases where a patient having an infectious or contagious disease has been confined in a hotel room, such room must, upon the removal of the patient, be closed and fumigated, and upon the completion of such fumigation the certificate of a reputable physician to that effect must be forwarded to the hotel inspector. In all hotels or lodging houses where 50 cents or more per night is charged for lodging the sheets and pillow cases must be changed after the departure of each guest, and it is unlawful to have upon a bed in any such hotel or lodging house a mattress of a lower grade than that commonly known to the trade as cotton-felt combination; each mattress must weigh at least 35 pounds unless it be a hair mattress, in which case it may weigh 30 pounds or more. Each hotel, rooming house, or restaurant where 50 cents or more per meal is charged is required to keep in its main public wash-room, individual towels or paper toweling in full view and reach of all guests at all hours. Each room must be properly ventilated by at least one window and by a doorway leading into the hall. All hotel windows must be screened against flies and mosquitoes.

For violation of this law there is provided a fine of not less than \$10 nor more than \$50, or by imprisonment, or both.

Hotels are required to furnish to their guests pure water free from disease germs, taken from a source far enough away from privy vaults or other means of contamination to insure freedom from pollution. Such water supply is subject to the inspection of the hotel inspector, and when found unfit for drinking purposes its use must be discontinued.

In addition to the sanitary provisions, provision is also made for adequate fire escapes, fire extinguishers, protected elevator shafts, and other contrivances for the safety of the guests.

Railroad stations and passenger coaches.—All railroad companies are required to maintain at railroad stations where passenger tickets are sold an approved form of toilet. Where a sewerage system is maintained within 300 feet of the station the water-closet must be within the house. Separate compartments must be provided for men and women. In the compartments for men there must be provided urinals draining into a sewer, vault, or other suitable place which will prevent the creation of a nuisance.

The board of railroad commissioners of the State or any local health officer is granted authority to inspect such installations, and if they are found insanitary it is the duty of the railroad company to make such alterations or repairs as will remedy the condition.

Waiting rooms must be scrubbed at least once a week with a standard disinfectant and must be maintained at all times in a comfortable and sanitary condition.

For violation there is provided a fine of not less than \$20 nor more than \$100.

It is prohibited to sweep any railroad coach occupied by passengers except the sweeping be done by some vacuum device, or except when the floor is first moistened by water or oil or some sweeping compound.

For violation there is provided a fine not to exceed \$25.

Sanitation of barber shops.—Barbers or barbers' apprentices and all persons engaged in hair dressing or manicuring must disinfect their tools in a manner approved by the State board of health before they are used on any of their customers.

For violation there is provided a fine of not less than \$25 nor more than \$200.

Disinfection of vehicles.—All cars, coaches, or boats transporting passengers in or through the State must be disinfected in an approved manner not more than 30 days from the date of use of such vehicle.

It is made the duty of every corporation engaged in the transportation of passengers to keep posted in the vehicle a printed notice stating the time and place at which the car, coach, or boat was last disinfected.

For violation there is provided a fine of not more than \$100.

Disinfection of second-hand goods.—It is made the duty of all dealers in second-hand goods to disinfect, in a manner approved by the State board of health, all second-hand furniture, bed clothes, wearing apparel, kitchen utensils, etc., before they are sold.

Sanitation of food-producing establishments.—Every building, room, basement, or cellar used as a bakery, cannery, packing house, slaughterhouse, dairy, creamery, cheese factory, restaurant, hotel, grocery, meat market, or other place of similar character, must be properly lighted, drained, plumbed, and ventilated, and must be conducted with strict regard to the influence of the surroundings on the health of the employees and the purity and wholesomeness of the food sold or manufactured therein.

All such establishments or vehicles used in the transportation of food products must be maintained in a sanitary condition. Food must be protected from flies, dirt, or other foreign or injurious substance. All apparatus used in the preparation must be thoroughly cleaned daily and the clothing of employees maintained in a cleanly state.

The interior of all rooms must be plastered, wainscoted, or ceiled with metal or lumber, oil painted or lime washed, and all painted surfaces must be kept clean by washing with soap and water. Floors must be made of an impervious material, such as cement, tile, brick, or wood, which can be flushed and washed clean with water.

All doors, windows, or other openings, during fly season, must be fitted with self-closing screen doors and wire window screens of a mesh not coarser than 14.

All places selling or manufacturing food must be provided with toilets separate from the room where the food is handled. The toilet compartment must have a floor made of a nonabsorbent material, which must be washed daily. These compartments must be properly ventilated. Lavatories supplied with soap, running water, and towels must be provided adjacent to toilets. The employees are required before handling any food or after visiting toilets to wash their hands and arms thoroughly in clean water.

When necessary, cuspidors must be provided. Expectoration, except into the cuspidors, is prohibited. Cuspidors must be washed out daily and disinfected, and at least 5 ounces of the disinfectant must be left in the cuspidor while in use.

No room in which food is handled may be used for sleeping purposes. No person is allowed to work in any place where food is handled who is affected with any venereal disease, smallpox, diphtheria, scarlet fever, yellow fever, tuberculosis, bubonic plague, Asiatic cholera, leprosy, trachoma, typhoid fever, epidemic dysentery, measles, mumps, German measles, whooping cough, chicken-pox, or any other communicable disease.

Inspectors or agents of the food commissioner are authorized to enter at all reasonable times every place where food products are manufactured or sold, and provision is made for the procedure to be carried out in the abatement of nuisances or in case of violation of the law.

For violation of this act adequate penalties are provided.

EXPENDITURES AND APPROPRIATIONS.

For the two-year period ended June 30, 1915, there were appropriated by the State legislature to the State board of health \$5,400, or \$2,700 per annum. The last legislature, however, reduced this amount, so that for the two-year period ending June 30, 1917, there is available to the State board of health only \$4,600, or \$2,300 per

annum. This legislature likewise saw fit to limit expenditures from this fund to definite amounts for specific purposes. A health organization which is really active is continually meeting emergencies. A health officer is not a prophet, and it is impossible for him to foretell what amounts he may require to meet these emergencies. To limit his activities by this means greatly interferes with efficient public health work. The money appropriated was allotted as follows:

Superintendent of public health, \$1,200 per annum.....	\$2,400
One stenographer, \$600 per annum.....	1,200
Postage.....	200
Office supplies.....	100
Traveling expense.....	200
Printing.....	400
Miscellaneous expense—telephone, express, etc.....	100
Total.....	4,600

From the above table it may be assumed that the activities of the board of health must be confined to the office, and it can be most emphatically stated that work of this kind is futile. A State board of health without a field force can accomplish nothing.

The following table shows the expenditures during the year ended June 30, 1915:

	Execu- tive office and board of health.	Educa- tional.	Vital sta- tistics.	Epidem- iology.	Total.
Dues, State and provincial boards of health.....	\$10.00				\$10.00
Express.....	.81	\$0.84	\$1.37		3.02
Office supplies.....	2.59		1.65	\$12.00	16.24
Postage.....	30.00	3.96	64.00		97.96
Printing and binding.....		136.50	192.00		329.10
Rent of vault.....			60.00		60.00
Salaries.....	1,920.00				1,920.00
Salaries (emergency clerks).....	70.00				70.00
Stationery.....	45.90				45.90
Telephone and telegraph.....				1.56	1.56
Traveling expenses.....	32.00				32.00
Total.....	2,111.30	141.30	319.62	13.56	2,585.78

In addition to the money appropriated to the State board of health there were appropriated for the biennial period ending June 30, 1917, to the public health laboratory \$16,000, or \$8,000 per annum, and to the Antituberculosis Association \$2,000, or \$500 for the year 1915 and \$1,500 for the year 1916. Thus there has been appropriated for strictly public health purposes for the two-year period a total of \$22,600 or approximately \$11,300 per annum.

The money available to the State for general purposes is approximately \$2,500,000 for a 12-month's period. Computing the amounts that should be spent for the preservation of the public health on the two per cent basis there would result the sum of \$50,000, which

would not be sufficient to support an adequate State health department including a district health organization. The former requires not less than \$25,000 and the later \$36,000.

As far as the districts are concerned it is believed that the counties can well afford to assume the expense. Property in the counties is assessed at but 33 per cent of its actual valuation and the tax levy has not nearly reached its maximum. Thirty-six thousand dollars, a sufficient amount to support six districts, when divided among 52 counties, would be a small sum. In time the revenues of the State will have so increased that the expense of the districts can be defrayed out of State funds.

For the present the State should appropriate \$25,000 for its State health department, it being assumed that such department will then perform the functions now being performed by the several State bodies, as, for instance, the laboratory work, hotel inspection, and antituberculosis work, in addition to other duties now not attempted. The sum represents but a little over twice as much as is now being spent by the several State bodies engaged in public health work. It might be allotted at the discretion of the board of health as follows:

Secretary, not less than.....	\$3, 000
Epidemiologist, not less than.....	2, 500
Sanitary engineer, not less than.....	2, 000
Bacteriologist, not less than.....	1, 500
2 assistant bacteriologists, at \$1,200.....	2, 400
2 clerks, at \$840.....	1, 680
1 clerk, at \$720.....	720
Maintenance of laboratory.....	4, 000
Traveling expenses, maintenance of office, etc.....	7, 200
Total.....	25, 000

RECOMMENDATIONS.

As a result of a careful study of public health administration in North Dakota it may be concluded that there is a great lack of organization and funds with which to carry on public health work. Such health measures as have been enacted are more or less scattered among different branches of the government, whereas all these measures should be coordinated and their enforcement imposed on a single State health organization. In order to bring about this condition the following recommendations are made:

1. That all public health activities now being performed by the State board of health and the public health laboratory, as well as the public health activities now being performed by other Government agencies, be brought together in a department of health.
2. That the department of health be divided into a board of health, the office of the secretary, a bureau of communicable diseases, a bureau of public health engineering, and a bureau of "vital statistics."

3. That the board of health be composed of five members to hold office for five years and that the method of their appointment be so arranged that there will be but one new appointment each year.

4. That the secretary of the State board of health be appointed by the board as State health officer; that he be a full-time official prohibited from engaging in the practice of medicine or any other business that will interfere with his official duties; that he hold office during efficiency and subject to discharge for cause only by the board of health, and that he receive a salary of not less than \$3,000 per year and necessary traveling expenses.

5. That a full-time chief, an epidemiologist, be placed at the head of the bureau of communicable diseases.

6. That a full-time chief, a sanitary engineer, be placed at the head of the bureau of public health engineering.

7. That a full-time chief be placed over the bureau of statistics.

8. That the control of the public health laboratory be transferred from the University of North Dakota to the State department of health.

9. That the work of the laboratory be divided into two parts, that relating to the diagnosis of disease being under the control of the epidemiologist, and that relating to sewage and water analyses being under the control of the sanitary engineer.

10. That a bacteriologist be employed to carry on the laboratory work.

11. That the duties of the epidemiologist be to have charge of the collection and disposition of morbidity reports, to keep currently informed regarding the prevalence and geographic distribution of controllable diseases throughout the State, to supervise the preventive measures of the department for the control of disease, and to supervise the work of district and other health officers.

12. That the sanitary engineer be given supervisory and advisory control over water supplies, sewerage systems, and the disposal of garbage and trade wastes throughout the State.

13. That the hotel inspector be transferred to the health department to perform, in addition to hotel inspection, such other sanitary inspections or investigations as may be directed by the secretary of the State board of health.

14. That special attention be paid by the secretary of the State board of health to the dissemination of information on matters relating to the public health through the medium of popular bulletins, lectures, and exhibits.

15. That the State be divided into not less than six districts, each district to be composed of one or more counties at the discretion of the State board of health.

16. That a physician trained in the science of public health be appointed by the State board of health for each district as district health officer and given an office and adequate number of assistants, including an inspector, nurses, and a clerk. No one should be appointed until he has passed a thorough examination before the State department of health and has otherwise proved himself capable of filling the position. He should first receive a probationary appointment, and he should be prohibited from engaging in any private business which would interfere with his official duties. He should hold office during efficiency and good behavior and receive an adequate salary, which, as he proves himself capable, should be increased at definite intervals until it has reached a maximum which, in the judgment of the department of health, is sufficient. He should be allowed actual and necessary expenses when traveling on official business.

17. That the district health officer be made responsible to the State department of health for the enforcement of State health laws and regulations, and, under the State department of health, have supervisory and advisory control over county, city, and town health officials.

18. That the powers and duties of the district health officer be defined by law and include the enforcement of the law regarding the notification of cases of disease; the inspection of dairies, canneries, industrial camps, and all places of business or manufacture within his jurisdiction; the inspection of county schools and school children; the investigation of cases of illness and the institution of measures for the control of disease; the investigation of nuisances and the abatement of same; the keeping of complete records of transactions and the forwarding of all necessary reports to the State department of health; the dissemination of sanitary information in his district; the enforcement of the laws relating to the registration of births and deaths, and the performance of all other duties that may be required of him by the State department of health.

19. That the field organization be mobile, so that the district health officers, or their assistants, could be concentrated in any part of the State or in any city within the State in case of emergency, or their transfer from one district to another effected in the interest of the public service.

20. That the county and city organizations remain as they are, but that all local officials perform their duties under the supervision of the district health officer.

21. That the clerical personnel of the department of health be increased so as to adequately perform all the duties imposed upon it.

22. That the entire personnel of the department of health, except the members of the board, be "full-time" employees.

23. That a comprehensive law be enacted making it compulsory on the part of all persons interested to have plans for proposed installations of water supplies, sewerage, and refuse-disposal systems, approved by the State department of health. That the State department of health be empowered to require any changes or extensions in already existing installations that may be necessary to insure safe water supplies or proper sewage or refuse-disposal systems; or to order the installation of water-supply and sewerage or refuse-disposal systems in the absence of same. That the State department of health have the power to close, or to prevent the use of water from, any well, spring, or other source that in its opinion is dangerous to health, or to require the filling or draining of places where there is any accumulation of water, breeding of mosquitoes, or other condition dangerous to health.

24. That the model law for morbidity reports with necessary modifications be enacted.

25. That a law be enacted giving power to the State department of health to organize a system of health supervision of schools and school children in rural schools, and to supervise such work performed by cities.

26. That provision be made by law for calling a conference of district and other health officers annually, or oftener, by the State health officer, the expenses so incurred to be paid by the State, county, or local authorities.

27. That all plans of public buildings be submitted to the State department of health for approval as to sanitary arrangements.

28. That quarters large enough to accommodate the different divisions, as contemplated in this report, be furnished for the State department of health at Bismarck.

29. That provision be made for the free distribution of diphtheria antitoxin throughout the State.

30. That the methods of keeping accounts be such as to allow an accurate determination of the exact cost of any bureau or division or any special work at any time.